

1 Positioning Devices for a Sensor Element of a Miniature Fan

2 Background of the Invention

3 1. Field of the Invention

4 The present invention relates to positioning devices
5 for a sensor element of a miniature fan.

6 2. Description of the Related Art

7 A wide variety of miniature fans have heretofore been
8 provided. For example, U.S. Patent No. 5,492,458 discloses an
9 electric fan including a housing having a hub formed in the
10 center, a shaft having one end force-fitted in the hub and
11 having an annular flange formed in the other end, two polar
12 plates force-fitted on the shaft, and a stator disposed
13 between the polar plates. Nevertheless, the starting effect
14 of the motor of such an electric fan is not satisfactory as a
15 sensor element on the circuit board for starting cannot be
16 accurately aligned with an end edge of the polar plates. The
17 present invention is intended to provide a positioning device
18 for the sensor element which mitigates and/or obviates the
19 above problems.

20 Summary of the Invention

21 It is a primary object of the present invention to
22 provide a positioning device which allows the motor of a
23 miniature fan to be easily activated.

24 A positioning device for a miniature fan in accordance
25 with the present invention comprises a coil seat including a
26 plurality of annularly spaced poles each having a stem and an

1 arcuate section. Each stem has a winding wound therearound,
2 and each arcuate section has a first end edge and a second
3 end edge. A circuit board is securely connected to the coil
4 seat and includes a sensor element mounted thereon. The
5 sensor element is located on a vertical line extending from
6 one of the first end edge and the second end edge of one of
7 the poles.

8 The pole having the first end edge or the second end
9 edge aligned with the sensor element has a first mark means
10 formed thereon, and the sensor element has a second mark
11 means formed thereon which is aligned with the first mark
12 means when mounting the sensor element onto the circuit board
13 to assure that the sensor element is located on the vertical
14 line.

15 The circuit board may include a notch defined therein
16 for securely receiving the sensor element. The circuit board
17 includes a third mark means aligned with the second mark
18 means to provide a reference for mounting the sensor element
19 in the notch by aligning with the second mark means of the
20 sensor element with the third mark means.

21 Other objects, advantages, and novel features of the
22 invention will become more apparent from the following
23 detailed description when taken in conjunction with the
24 accompanying drawings.

25 Brief Description of the Drawings

26 Fig. 1 is an exploded perspective view of a

1 positioning device for miniature fans in accordance with the
2 present invention;

3 Fig. 2 is a schematic side view of the positioning
4 device in accordance with the present invention;

5 Fig. 3 is an exploded perspective view of a second
6 embodiment of the positioning device in accordance with the
7 present invention;

8 Fig. 4 is an exploded perspective view illustrating a
9 third embodiment of the positioning device in accordance with
10 the present invention; and

11 Fig. 5 is a schematic side view of the third
12 embodiment of the positioning device.

13 Description of the Preferred Embodiments

14 Referring to the drawings and initially to Figs. 1 and
15 2, a positioning device for miniature fans in accordance with
16 the present invention generally includes a coil seat 1 and a
17 circuit board 2. The coil seat 1 includes a number of
18 annularly spaced poles 11 each having a ^{radially extending} stem 12 and an
19 arcuate section 18 with a first end edge 13 and a second end
20 edge 14. The stem 12 of each pole 11 includes a winding 14
21 wound therearound. The coil seat 1 includes a central opening
22 15 for receiving an axle 21 formed on a side of the circuit
23 board 2.

24 The circuit board 2 includes a plurality of electric
25 elements 22 for controlling rotation of the fan, which is
26 conventional and therefore not described in detail. A sensor

1 element 23 is mounted on the circuit board 2 in a manner that
2 the first end edge 13 of one of the poles 11 aligns with the
3 sensor element 23. For easy assembly, the first end edge 13
4 has a first mark means 16 formed thereon, and the sensor
5 element 23 includes a second mark means 24 formed thereon
6 such that when mounting the sensor element 23 on the circuit
7 board 2 (the circuit board 2 has been engaged with the coil
8 seat 1), the second mark 24 is aligned with a first mark 16
9 formed on the arcuate section 18 adjacent to the first end
10 edge 13 to assure alignment of the sensor element 23 and the
11 first end edge 13 in a vertical direction. The mark means 16
12 and 24 may be lines, dots, etc. By such an arrangement, the
13 sensor element 23 on the circuit board 2 is accurately
14 aligned with the first end edge 13 of one of the poles 11 to
15 thereby provide a reliable starting of a rotor of the motor
16 (not shown), which is conventional and therefore not further
17 described.

18 Fig. 3 illustrates a modified embodiment of the
19 invention, wherein the circuit board 2 includes a notch 25
20 defined therein for receiving the sensor element 23 with the
21 second mark 24 formed thereon. In addition, a number of pin
22 holes 26 are defined in the circuit board 2 adjacent to the
23 notch 25 for receiving the pins (not shown) of the sensor
24 element 23, which is conventional and therefore not further
25 described. The circuit board 2 includes a third mark means 27
26 formed adjacent to the notch 25. The mark means 16 and 24,

1 and 27 may be lines, dots, etc. In assembly, the third mark
2 means 27, which is already in alignment with the first mark
3 means 16, provides a reference for aligning with the second
4 mark means 24 such that the sensor element 23 is in alignment
5 with the first end edge 13 of one of the poles 11 to thereby
6 provide a reliable activation of the rotor of the motor.

7 Figs. 4 and 5 illustrate a third embodiment of the
8 invention, in which the second end edge 14 of one of the
9 poles 11 aligns with the sensor element 23, while a first
10 mark means 16 is provided on the arcuate section 18 adjacent
11 to the rear end edge 14 to provide a reference for mounting
12 the sensor element 23 onto the circuit board 2.

13 Conclusively, the sensor element 23 is located on a
14 vertical line extending from the end edge 13, 14 of one of
15 the poles 11 along a direction parallel to a longitudinal
16 axis "X" of the coil seat 1 such that the rotor may be
17 reliably activated to rotate.

18 Although the invention has been explained in relation
19 to its preferred embodiment, it is to be understood that many
20 other possible modifications and variations can be made
21 without departing from the spirit and scope of the invention
22 as hereinafter claimed.

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